external transmission path arranged on a pre-stage side of said optical amplifying means, so that wavelength division multiplexed signal light which contains optical signals of the second wavelength band which have been Raman amplified by said Raman amplification producing medium, are input to said optical amplifying means.

A1 concl

2. (ONCE AMENDED) An optical amplifier according to claim 1,

wherein there is provided demultiplexing means demultiplexing said wavelength division multiplexed signal light into respective optical signals of a first wavelength band and a second wavelength band, and multiplexing means multiplexing respective optical signals of the first wavelength band and the second wavelength band which have been demultiplexed by said demultiplexing means,

said optical amplifying means has a first amplifying section amplifying optical signals of the first wavelength band which have been demultiplexed by said demultiplexing means, and a second amplifying section amplifying optical signals of the second wavelength band which have been demultiplexed by said demultiplexing means, and

said optical amplifying means supplying via said demultiplexing means a part of said excitation light used in said first amplifying section to said Raman amplification producing medium, so that optical signals of the second wavelength band which have been Raman amplified by said Raman amplification producing medium, are input via said demultiplexing means to said second optical amplifying section.

4. (ONCE AMENDED) An optical amplifier according to claim 3, wherein said first optical amplifying section comprises an erbium doped fiber, at least one excitation light source generating excitation light of a 1480nm band, and an optical coupler supplying excitation light generated by said excitation light source to said erbium doped fiber from a rear side, wherein a part of said excitation light is passed through said erbium doped fiber and said demultiplexing means and supplied to said Raman amplification producing medium.

A2

5. (ONCE AMENDED) An optical amplifier according to claim 1, wherein there is provided demultiplexing means demultiplexing said wavelength division multiplexed signal light into respective optical signals of a first wavelength band and a second wavelength band, and multiplexing means multiplexing respective optical signals of the first wavelength band and the second wavelength band which have been demultiplexed by said demultiplexing means,

said optical amplifying means has a pre-stage amplifying section collectively amplifying

said wavelength division multiplexed signal light input to said demultiplexing means, and a second optical amplifying section amplifying only optical signals of the second wavelength band which have been demultiplexed by said demultiplexing means, and

A2 concl.

said optical amplifying means supplying a part of said excitation light used in a part of said pre-stage optical amplifying section to said Raman amplification producing medium, wavelength division multiplexed signal light which contains optical signals of said second wavelength band which have been Raman amplified by said Raman amplification producing medium are input to said pre-stage optical amplifying section.

A3

7. (ONCE AMENDED) An optical amplifier according to claim 6, wherein said pre-stage optical amplifying section comprises an erbium doped fiber, at least one excitation light source generating excitation light of a 1480nm band, and an optical coupler supplying excitation light generated by said excitation light source to said erbium doped fiber from a rear side, wherein a part of said excitation light is passed through said erbium doped fiber and supplied to said Raman amplification producing medium.

A4

9. (ONCE AMENDED) An optical amplifier according to claim 1, wherein said external transmission path is of a hybrid transmission path formed by connecting a positive dispersion fiber having a positive wavelength dispersion value and a positive dispersion slope with respect to a signal light wavelength band, and a negative dispersion fiber having a negative wavelength dispersion value and a negative dispersion slope with respect to the signal light wavelength band, wherein one end on the side of said negative dispersion fiber is arranged at an input side of said optical amplifying means and functions as said Raman amplification producing medium.

10. (ONCE AMENDED) An optical amplifier according to claim 1, wherein there is provided optical power constant control means monitoring an output power of said wavelength division multiplexed signal light, and controlling an excitation light driving condition of said optical amplifying means so that said output power becomes constant.

11. (ONCE AMENDED) An optical amplifier according to claim 1, wherein there is provided gain constant control means monitoring a gain in said optical amplifying means, and controlling an excitation light driving condition of said optical amplifying means so that said gain becomes constant.

A4 conch.

12. (ONCE AMENDED) An optical amplifier according to claim 1, wherein there is provided supervisory control means processing a supervisory control signal transmitted together with said wavelength division multiplexed signal light.

14. (ONCE AMENDED) An optical amplifier according to claim 5 comprising:

first power monitor means monitoring the optical signal power of the first wavelength band which has been demultiplexed by said demultiplexing means;

A5

second power monitor means monitoring the optical signal power of the second wavelength band which has been amplified by said second optical amplifying section; and

optical power deviation control means controlling the operation of at least one of said pre-stage optical amplifying section and said second optical amplifying section in response to the respective monitor results of the first and second power monitor means, so that the optical power deviation for the first and the second wavelength bands becomes constant.

Please ADD the following NEW claims:

18. (NEW) An optical amplifier for amplifying wavelength division multiplexed signal light which contains respective optical signals of a first wavelength band and a second wavelength band, comprising:

A6

an optical amplifying unit amplifying said wavelength division multiplexed signal light using a rare earth element doped fiber to which excitation light is supplied,

Sub B2

wherein the excitation light used by said optical amplifying unit has a wavelength capable of producing Raman amplification with respect to optical signals of said second wavelength band, and

said optical amplifying unit supplying said excitation light which has the wavelength capable of producing the Raman amplification with respect to the optical signals of said second wavelength band to a Raman amplification producing medium which forms at least a part of an external transmission path arranged on a pre-stage side of said optical amplifying unit, so that wavelength division multiplexed signal light which contains optical signals of the second wavelength band which have been Raman amplified by said Raman amplification producing medium, are input to said optical amplifying unit.

19. (NEW) An optical amplifier according to claim 18,

wherein there is provided a demultiplexing unit demultiplexing said wavelength division multiplexed signal light into respective optical signals of a first wavelength band and a second wavelength band, and a multiplexing unit multiplexing respective optical signals of the first wavelength band and the second wavelength band which have been demultiplexed by said demultiplexing unit,

said optical amplifying unit has a first amplifying section amplifying optical signals of the first wavelength band which have been demultiplexed by said demultiplexing unit, and a second amplifying section amplifying optical signals of the second wavelength band which have been demultiplexed by said demultiplexing unit, and

said optical amplifying unit supplying via said demultiplexing unit a part of said excitation light used in said first amplifying section to said Raman amplification producing medium, so that optical signals of the second wavelength band which have been Raman amplified by said Raman amplification producing medium, are input via said demultiplexing unit to said second optical amplifying section.

A6 contd

20. (NEW) An optical amplifier according to claim 19, wherein when said first wavelength band is a 1550nm band and said second wavelength band is a 1580nm band, a wavelength of the excitation light used in said first optical amplifying section contains a 1480nm band.

21. (NEW) An optical amplifier according to claim 20, wherein said first optical amplifying section comprises an erbium doped fiber, at least one excitation light source generating excitation light of a 1480nm band, and an optical coupler supplying excitation light generated by said excitation light source to said erbium doped fiber from a rear side, wherein a part of said excitation light is passed through said erbium doped fiber and said demultiplexing unit and supplied to said Raman amplification producing medium.

22. (NEW) An optical amplifier according to claim 18, wherein there is provided a demultiplexing unit demultiplexing said wavelength division multiplexed signal light into respective optical signals of a first wavelength band and a second wavelength band, and a multiplexing unit multiplexing respective optical signals of the first wavelength band and the second wavelength band which have been demultiplexed by said demultiplexing unit,

said optical amplifying unit has a pre-stage amplifying section collectively amplifying said wavelength division multiplexed signal light input to said demultiplexing unit, and a second optical amplifying section amplifying only optical signals of the second wavelength band which have been demultiplexed by said demultiplexing unit, and

said optical amplifying unit supplying a part of said excitation light used in a part of said pre-stage optical amplifying section to said Raman amplification producing medium, wavelength division multiplexed signal light which contains optical signals of said second wavelength band which have been Raman amplified by said Raman amplification producing medium are input to said pre-stage optical amplifying section.

A6 Contd

23. (NEW) An optical amplifier according to claim 22, wherein when said first wavelength band is a 1550nm band and said second wavelength band is a 1580nm band, a wavelength of the excitation light used in said pre-stage optical amplifying section contains a 1480nm band.

24. (NEW) An optical amplifier according to claim 23, wherein said pre-stage optical amplifying section comprises:

an erbium doped fiber;

at least one excitation light source generating excitation light of a 1480nm band; and

an optical coupler supplying excitation light generated by said excitation light source to said erbium doped fiber from a rear side, wherein a part of said excitation light is passed through said erbium doped fiber and supplied to said Raman amplification producing medium.

25. (NEW) An optical amplifier according to claim 18, wherein said Raman amplification producing medium is an optical fiber which is designed so that a non-linear effective cross section is small compared to a 1.3μm zero dispersion single mode fiber.

26. (NEW) An optical amplifier according to claim 18, wherein said external transmission path is of a hybrid transmission path formed by connecting a positive dispersion fiber having a positive wavelength dispersion value and a positive dispersion slope with respect to a signal light wavelength band, and a negative dispersion fiber having a negative wavelength dispersion value and a negative dispersion slope with respect to the signal light wavelength band, wherein one end on the side of said negative dispersion fiber is arranged at an input side of said optical amplifying unit and functions as said Raman amplification producing medium.

27. (NEW) An optical amplifier according to claim 18, wherein there is provided an optical power constant control unit monitoring an output power of said wavelength division multiplexed signal light, and controlling an excitation light driving condition of said optical amplifying unit so that said output power becomes constant.

28. (NEW) An optical amplifier according to claim 18, wherein there is provided a gain constant control unit monitoring a gain in said optical amplifying unit, and controlling an excitation light driving condition of said optical amplifying unit so that said gain becomes constant.

29. (NEW) An optical amplifier according to claim 18, wherein there is provided a supervisory control unit processing a supervisory control signal transmitted together with said wavelength division multiplexed signal light.

30. (NEW) An optical amplifier according to claim 22, further comprising:

a first power monitor unit monitoring the optical signal power of the first wavelength band which has been demultiplexed by said demultiplexing unit;

a second power monitor unit monitoring the optical signal power of the second wavelength band which has been amplified by said second optical amplifying section; and

an optical power deviation control unit controlling the operation of at least one of said pre-stage optical amplifying section and said second optical amplifying section in response to the respective monitor results of the first and second power monitor unit, so that the optical power deviation for the first and the second wavelength bands becomes constant.

31. (NEW) An optical amplifier for amplifying wavelength division multiplexed signal light which contains respective optical signals of a first wavelength band and a second wavelength band, comprising:

an optical amplifying unit amplifying said wavelength division multiplexed signal light, and supplying an excitation light having a wavelength capable of producing a Raman amplification with respect to the optical signals of said second wavelength band to a Raman amplification producing medium which forms at least a part of an external transmission path arranged on a pre-stage side of said optical amplifying unit, so that wavelength division multiplexed signal light which contains optical signals of the second wavelength band which